

REMARKS

Claims 1 and 3-19 are in this application and are presented for consideration. By this Amendment, Applicant has amended claims 1, 4 and 6. Applicant has also added new claims 8-19.

Claims 1, 4 and 6 have been objected to because of minor informalities. Applicant has amended the claims to address this issue. Applicant wishes to thank the Examiner for the careful review of the claims.

Claim 4 has been rejected under 35 U.S.C. 102(b) as being anticipated by JP S63-66054 ("JP '054" hereinafter).

The present invention relates to a brush holder device that is used in motors. The brush holder device includes a holder and a brush arm. Both the holder and the brush arm have brush holder contact portions. Each brush contact portion of the brush arm is located at an edge that defines the engagement hole of the brush arm. Each brush contact portion of the holder is located at an edge that defines the engagement hole of the holder. The engagement hole of the holder is aligned with the engagement hole of the brush arm when the holder is connected to the brush arm. The brush contact portions of the brush arm extend through the engagement hole of the holder so that each brush contact portion of the brush arm is next to one of the brush contact portions of the holder when the brush arm is connected to the holder. The brush contact portions of the holder and the brush arm engage each side of the engagement portion of the brush so that the brush is connected to the brush arm and the holder. The connection of the brush arm to the holder is significant in the present invention because it advantageously

enhances the strength, rigidity and durability of the holder. This connection advantageously prevents torsion of a brush-holding portion of the brush arm. This advantageously provides a brush holder device that has a longer service life. Further, the brush contact portions of the brush arm and the holder advantageously provide for better heat radiating characteristics than conventional techniques. The prior art as a whole fails to disclose such features or advantages.

JP '054 discloses a brush arm 1 having an insertion hole 2 and a fixing plate 7 having a hole 8. A brush 13 is inserted into the brush insertion hole 13 of the brush arm 1. The brush 13 is then press-fitted to the fixing plate 7 via brush-pressing portions 9, 10 of the fixing plate 7 and via bent portions 11, 12 of the fixing plate 7 that press up against bent portions 3, 4 of the brush arm 1.

JP '054 fails to teach or suggest the combination of brush contact portions formed at an edge defining an engagement hole as claimed. As clearly shown in Figure 1 of JP '054, the brush arm 1 does not have brush contact portions located along at an edge defining the hole 2. JP '054 merely discloses that the brush arm 1 has an edge defining the hole 2, but does not suggest a brush contact portion located at an edge defining the hole 2 as claimed. In fact, JP '054 fails to teach or suggest the combination of brush contact portions formed on opposite edges in a longitudinal direction of a brush arm. As clearly shown in Figure 1 of JP '054, the brush-pressing portions 9, 10 are formed on edges in a direction transverse of the longitudinal direction of the brush arm 1. In contrast to JP '054, one brush contact portion of the holder in the present invention is located opposite another brush contact portion of the holder in a longitudinal direction of the brush arm. This is significant in the present invention because this

allows space for the brush contact portions of the brush arm to pass through the engagement hole of the holder. This advantageously provides rigidity and strength to the holder because when the brush is press-fitted into the engagement holes of the holder and brush arm, the brush contact portions press up against the edges of the holder. This advantageously prevents torsion of the brush arm and enhances the overall durability of the holder, which leads to a longer service life of the brush holding device. JP '054 fails to provide brush-pressing portions 9, 10 that are formed on edges in a longitudinal direction of the brush arm 1. In fact, JP '054 does not teach that brush arm 1 has brush contacting portions that extend through the insertion hole 8 of the fixing plate 7 as featured in the claimed combination. As such, the prior art as a whole takes a different approach and fails to suggest the features of the present invention. Accordingly, Applicant respectfully requests that the Examiner favorably consider claim 4 as now presented.

Claims 1 and 6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over JP '054, and further in view of Uchino et al. (JP 11252869).

Uchino et al. discloses a brush holder device 1 having first and second planar pressure pieces 2g, 2h arranged in the direction of revolution of a commutator. The first and second planar pressure pieces 2g, 2h are capable of being brought into planar contact with the brush holder attaching portion of a brush 10. Third and fourth planar pressure pieces 2i, 2j are placed in a direction orthogonal to the direction of the revolution of the commutator. The third and fourth planar pressure pieces 2i, 2j are capable of being brought into planar contact with the brush holder attaching portion 10c of the brush 10. First and second linear pressure pieces 2n,

2p are placed in the direction orthogonal to the direction of revolution of the commutator. The first and second linear pressure pieces 2n, 2p are capable of being brought into linear contact with the brush holder attaching portion 10c of the brush 10.

JP '054 and Uchino et al. fail to teach and fails to suggest the combination of a holder composed of a material that has lower spring characteristics than the brush arm. JP '054 merely discloses a brush 13 that is press-fitted to a fixing plate 7 via brush-pressing portions 9, 10 of a fixing plate 7 and via bent portions 11, 12 of the fixing plate 7 that press up against bent portions 3, 4 of a brush arm 1. However, JP '054 fails to disclose that the fixing plate 7 is made of a material having lower spring characteristics than that of the brush arm 1. Uchino et al. also discloses a brush holder device 1 having various planar pressure pieces. Similar to JP '054, Uchino et al. is void of any suggestion for a holder having lower flexibility than a brush arm. Uchino et al. fails to provide any suggestion for how the spring properties of the brush holder device 1 compares to any brush arm. In contrast to JP '054 and Uchino et al., the holder of the present invention is less flexible than the brush arm. According to the present invention, the brush arm imparts a predetermined tension to the brush. The holder of the present invention does not require intensive spring properties and is advantageously made of a thicker and less flexible material to provide a rigid and strong connection to the brush. This advantageously allows the holder to act as a heat radiator and provides better heat radiating characteristics than conventional techniques. JP '054 and Uchino et al. do not disclose such strength and heat radiating advantages since the references as a whole do not provide any suggestion for a holder composed of a material that is less flexible than a brush arm as claimed.

JP '054 and Uchino et al. further fail to teach or suggest the combination of holder brush contact portions formed on opposite edges in a longitudinal direction of a brush arm, wherein the brush contact portions of the brush arm have a length corresponding to a longitudinal length of the brush receiving hole of the holder. JP '054 and Uchino et al. merely disclose brush arms, but the references as a whole fail to provide any suggestion of a brush contact portion that extends through a receiving hole of a holder such that the holder and the brush arm are connected to a brush. The Office Action states on page 5, lines 13-15 that ". . . a person of ordinary skill in the art could have modified the holder of JP '054 to include the brush contact portions oriented in the longitudinal direction for the purpose of enhancing the rigidity of the device . . ." Applicant respectfully disagrees with this statement since it is impossible in JP '054 to orient the holder brush contact portion in the longitudinal direction. JP '054 clearly discloses that it is necessary that the brush-pressing portions 9, 10 of the fixing plate 7 are parallel with bent portions 11, 12 of the fixing plate 7 as well as bent portions 3, 4 of the brush arm 1. The paralleled brush-pressing portions 9, 10 of JP '054 and bent portions 11, 12 of the fixing plate 7 are inserted between the bent portions 3, 4 of the brush arm 1 and side walls of the brush 13 (see Figure 3) to press-fit the brush 13 against the brush arm 1 by the resiliency of the fixing plate 7. As such, the brush-pressing portions 9, 10 could not function if the portions 9, 10 are formed along the opposite edges in a longitudinal direction of the brush arm 1 since portions 9, 10 would no longer be press-fitted against the brush 13. As such, the combination of JP '054 and Uchino et al. does not lead the person of ordinary skill in the art toward a brush arm and a holder having brush contact portions formed on opposite edges in a

longitudinal direction of a brush arm as claimed. Accordingly, Applicant respectfully requests that the Examiner favorably consider claims 1 and 6 as now presented and all claims that respectively depend thereon.

Claims 3 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al., and further in view of Yoshida (US 4,238,703).

Although Yoshida teaches a brush device having a brush fitting section having a pair of brush holding flaps which are mutually opposed along a lengthwise direction of the holder, the references as a whole fail to suggest the combination of features claimed. Specifically, JP '054 and Uchino et al. provide no teaching for the combination of brush contact portions formed on opposite edges in a longitudinal direction of a brush arm. The references together do not suggest the combination of features claimed. One of ordinary skill in the art is presented with various concepts, but these concepts do not provide any direction as to combining the features claimed. All claims define over the prior art as a whole.

Claim 5 has been rejected under 35 U.S.C. 103(a) as being unpatentable over JP '054, and further in view of Yoshida.

As previously discussed above, JP '054 fails to provide any suggestion for the combination of holder brush contact portions formed on opposite edges in a longitudinal direction of a brush arm. As such, all claims define over the prior art as a whole.

Applicant has added new independent claim 8. New independent claim 8 provides for similar features as found in claim 1, but in different claim language. Applicant has also added new dependent claims 9-19 to further clarify the features of the invention.

Favorable action on the merits is requested.

Respectfully submitted
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